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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|-----------------------------|------------------|
| 10/645,909 | 08/22/2003 | Chikara Yamamoto | KAW-304-USAP | 8553 |
| 7590 | 06/07/2004 | | EXAMINER SEVER, ANDREW T | |
| Ronald R. Snider Snider & Associates P.O. Box 27613 Washington, DC 20038-7613 | | | ART UNIT 2851 | PAPER NUMBER |

DATE MAILED: 06/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--|---|
| Office Action Summary | Application No. 10/645,909 | Applicant(s) YAMAMOTO, CHIKARA | |
| | Examiner Andrew T Sever | Art Unit 2851 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Rodney Fuller
Primary Examiner



Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 6 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Jung (US 6,144,420.)

Jung teaches in figure 5 a projector optical system comprising:

A digital micromirror device (DMD) for modulating illumination light (151, 158, 161), the DMD including minute mirror elements with variable light-reflecting directions, the minute mirror elements being arranged regularly within a plane so as to correspond to respective pixels of an image, each minute mirror element switching, according to a video signal fed therein, between two states having respective angles of rotation different from each other so as to selectively reflect the illumination light into one of first and second directions; (This is the inherent method by which a DMD operates, see for example US 5,061,049 to Hornbeck, 5,535,047 to Hornbeck, 5,061,049 to Hornbeck, US 2003/0016335 to Penn, US 6,582,080 to Gibbon et al.)

An illumination optical system for illuminating the DMD with a luminous flux having a uniform polarization direction (110 and 120);

A projection optical system for projecting onto a predetermined projection surface the luminous flux modulated by the DMD (180); and

Luminous flux separating means for making light from the illuminating optical system incident on the DMD and guiding to the projection optical system the illumination light modulated by the DMD and emitted in the first direction (130, 140,);

Wherein the luminous flux separating means has a polarization separating surface for separating a luminous flux incident on the DMD and a luminous flux emitted from the DMD from each other (not labeled but 130 is a PBS with a polarization separating surface in the middle); and

Wherein polarization direction rotating means for rotating a polarization direction is disposed between the polarization separating surface and the DMD (153, 157, and 163).

With regards to applicant's claim 2:

The luminous flux separating means is a prism member

With regards to applicant's claim 3:

The polarization direction rotating means is specified in column 6 lines 8-16 to be quarter-wave plates.

With regards to applicant's claim 5:

See column 6 lines 8-22.

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With regards to applicant's claim 6:

Jung's system is a projector apparatus.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jung as applied to claim 1-3, 5, and 6 above, and further in view of Cannon et al. (US 6,726,332.)

As described in more detail above, Jung teaches a projector optical system comprising a DMD, an illumination optical system for illuminating the DMD with luminous flux having a uniform polarization direction; a projection optical system for projecting onto a predetermined projection surface the luminous flux modulated by the DMD, and a luminous flux separating means for making light from the illumination optical system incident on the DMD and guiding to the projection optical system the illumination light modulated by the DMD. Jung further teaches placing polarization direction rotating means for rotating a polarization direction between the polarization-separating surface of the luminous flux separating means and the DMD.

Jung does not specifically teach that the projection optical system is telecentric. It is well known, however to make the projection optical system, especially with DMD systems, telecentric, as is taught by Cannon et al. in column 4 lines 1-9 where it is taught

that telecentric projection lens make designing the projection optical system easier and also in the case of rear projection type displays where DMD type projector are frequently employed, it always the imager device to be in roughly the same orientation as the screen. Accordingly it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a telecentric projection optical system in the projector optical system taught by Jung.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

US 6,412,949 to Halldorsson teaches in figure 2 a projection system utilizing DMDs (21 and 22) and polarization direction rotating means (9 and 8). In this case it is for stereoscopic viewing.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew T Sever whose telephone number is 571-272-2128. The examiner can normally be reached on 8:30-5:00.

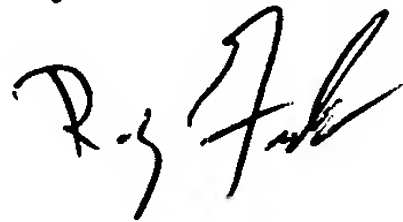
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on 271-272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AS

Rodney Fuller
Primary Examiner

A handwritten signature in black ink, appearing to read 'R. Fuller', is written below the printed name and title.